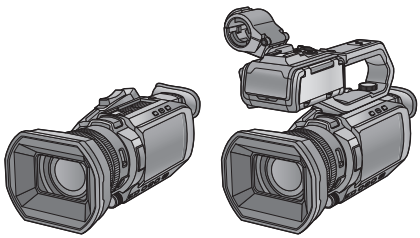
Panasonic

Basic Owner's Manual

4K Video Camera

Model No. HC-X1500
HC-X2000



Please read these instructions carefully before using this product, and save this manual for future use.

More detailed operating instructions are available in "Owner's Manual (PDF format)".
To read it, download it from the website.
https://eww.pavc.panasonic.co.jp/hdw/oi/X2000/

Register online at http://shop.panasonic.com/support (U.S. customers only)

If you have any questions, visit :
U.S.A. : http://shop.panasonic.com/support
Canada : www.panasonic.ca/english/support

PP

DVQX2023ZA
F0120TY0

Safety Precautions

Dear Customer,

Thank you for choosing Panasonic!
You have purchased one of the most sophisticated and reliable products on the market today. Used properly, we're sure it will bring you and your family years of enjoyment. Please take time to fill in the information on the right.
The serial number is on the tag located on the back of your camera. Be sure to **retain this manual** as your convenient camera information source.

Date of Purchase

Dealer Purchased From

Dealer Address

Dealer Phone No.

Model No.

Serial No.

U.S.A./CANADA CONSUMERS: ATTENTION:

A lithium ion battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY for information on how to recycle this battery.

WARNING:

To reduce the risk of fire, electric shock or product damage,
- Do not expose this unit to rain, moisture, dripping or splashing.
- Do not place objects filled with liquids, such as vases, on this unit.
- Use the recommended accessories.
- Do not remove covers.
- Do not repair this unit by yourself. Refer servicing to qualified service personnel.

CAUTION!

To reduce the risk of fire, electric shock or product damage,
- Do not install or place this unit in a bookcase, built-in cabinet or in another confined space. Ensure this unit is well ventilated.
- Do not obstruct this unit's ventilation openings with newspapers, tablecloths, curtains, and similar items.
- Do not place sources of naked flames, such as lighted candles, on this unit.

Certification and Compliance
See Camera for the certification and compliance mark specific to that device.

1 Press the <MENU> button.
2 Select the [OTHERS] menu.
3 Select the [APPROVED REGULATION] menu.

THE FOLLOWING APPLIES ONLY IN THE U.S.A.

FCC Note:
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

- Any unauthorized changes or modifications to this equipment would void the user's authority to operate this device.
- To assure continued compliance, follow the attached installation instructions and use only shielded interface cables when connecting to computer or peripheral devices.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Supplier's Declaration of Conformity

Trade Name:	Panasonic
Model No.:	HC-X1500/HC-X2000
Responsible Party:	Panasonic Corporation of North America Two Riverfront Plaza, Newark, NJ 07102-5490
Support Contact:	http://shop.panasonic.com/support

THE FOLLOWING APPLIES ONLY IN CANADA.

CAN ICES-3(B)/NMB-3(B)

THE FOLLOWING APPLIES ONLY IN THE U.S.A.

Contains FCC ID: VPYLB1JS955

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines as this equipment has very low levels of RF energy.

Compliance with FCC requirement 15.407(c)
Data transmission is always initiated by software, which is the passed down through the MAC, through the digital and analog baseband, and finally to the RF chip. Several special packets are initiated by the MAC. These are the only ways the digital baseband portion will turn on the RF transmitter, which it then turns off at the end of the packet. Therefore, the transmitter will be on only while one of the aforementioned packets is being transmitted. In other words, this device automatically discontinue transmission in case of either absence of information to transmit or operational failure.

Frequency Tolerance: ± 20ppm

THE FOLLOWING APPLIES ONLY IN CANADA.

Contains IC: 772C-LB1JS955

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

The available scientific evidence does not show that any health problems are associated with using low power wireless devices. There is no proof, however, that these low power wireless devices are absolutely safe. Low power Wireless devices emit low levels of radio frequency energy (RF) in the microwave range while being used. Whereas high levels of RF can produce health effects (by heating tissue), exposure of low-level RF that does not produce heating effects causes no known adverse health effects. Many studies of low-level RF exposures have not found any biological effects. Some studies have suggested that some biological effects might occur, but such findings have not been confirmed by additional research. HC-X2000/ HC-X1500 (HMN is 1JS2099) has been tested and found to comply with ISED radiation exposure limits set forth for an uncontrolled environment and meets RSS-102 of the ISED radio frequency (RF) Exposure rules.

IMPORTANT SAFETY INSTRUCTIONS

Read these operating instructions carefully before using the unit. Follow the safety instructions on the unit and the applicable safety instructions listed below. Keep these operating instructions handy for future reference.

1) Read these instructions.
2) Keep these instructions.
3) Heed all warnings.
4) Follow all instructions.
5) Do not use this apparatus near water.
6) Clean only with dry cloth.
7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9) Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11) Only use attachments/accessories specified by the manufacturer.
12) Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/ apparatus combination to avoid injury from tip-over.

13) Unplug this apparatus during lightning storms or when unused for long periods of time.
14) Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

■ Concerning the AC adaptor

AC adaptor

This AC adaptor operates on AC between 100 V and 240 V.
But

- In the U.S.A. and Canada, the AC adaptor must be connected to a 120 V AC power supply only.
- When connecting to an AC supply outside of the U.S.A. or Canada, use a plug adaptor to suit the AC outlet configuration.
- When connecting to a supply of greater than AC 125V, ensure the cord you use is suited to the voltage of the AC supply and the rated current of the AC adaptor.
- Contact an electrical parts distributor for assistance in selecting a suitable AC plug adaptor or AC cord set.

The power plug is the disconnecting device. Install this unit so that the power plug can be unplugged from the socket outlet immediately.

This unit is intended for use in moderate climates.

■ Concerning the battery

Battery pack (Lithium ion battery pack)

- Use the specified unit to recharge the battery pack.
- Do not use the battery pack with equipment other than the specified unit.
- Do not get dirt, sand, liquids, or other foreign matter on the terminals.
- Do not touch the plug terminals (+ and −) with metal objects.
- Do not disassemble, remodel, heat or throw into fire.

If any electrolyte should come into contact with your hands or clothes, wash it off thoroughly with water.
If any electrolyte should come into contact with your eyes, never rub the eyes. Rinse eyes thoroughly with water, and then consult a doctor.

Warning

Risk of fire, explosion and burns. Do not disassemble, heat above 60 °C (140 °F) or incinerate.

CAUTION

- Danger of explosion if battery is incorrectly replaced. Replace only with the type recommended by the manufacturer.
- When disposing of the batteries, please contact your local authorities or dealer and ask for the correct method of disposal.

■ Product Identification Marking

Product	Location
4K Video Camera	Bottom
AC adaptor	Bottom

■ Cautions for use

Keep this unit as far away as possible from electromagnetic equipment (such as microwave ovens, TVs, video games etc.).

- If you use this unit on top of or near a TV, the pictures and/or sound on this unit may be disrupted by electromagnetic wave radiation.
- Do not use this unit near cell phones because doing so may result in noise adversely affecting the pictures and/or sound.
- Recorded data may be damaged, or pictures may be distorted, by strong magnetic fields created by speakers or large motors.
- Electromagnetic wave radiation generated by microprocessors may adversely affect this unit, disturbing the pictures and/or sound.
- If this unit is adversely affected by electromagnetic equipment and stops functioning properly, turn this unit off and remove the battery or disconnect AC adaptor. Then reinsert the battery or reconnect AC adaptor and turn this unit on.

Do not use this unit near radio transmitters or high-voltage lines.

If you record near radio transmitters or high-voltage lines, the recorded pictures and/or sound may be adversely affected.

Do not lift up this unit by the handle with the tripod still attached

- When the tripod is attached, its weight will also affect the unit's handle, possibly causing the handle to break and hurting the user.
- To carry the unit while the tripod is attached, take hold of the tripod.

Do not swing the unit around, shake it by, or allow it hang from the handle

- Do not jar, swing, or shake the unit by its handle. Any strong jolt to the handle may damage the unit or result in personal injury.

Do not allow the cord to drag on the ground or pull a connected cord along the passage

- The cord will be damaged, causing fire or electrical shock, when the cord gets caught by the feet, excite will also cause personal injury.

When this unit is turned on, do not use it in direct contact with the skin for a long period of time.

- When using this unit for a long period of time, use a support such as a tripod. Low temperature burns may result if any high temperature part of this unit or hot air from the ventilation openings on the front side of the hand strap of this unit is in direct contact with the skin for a long period of time.

About connecting to a PC

- A USB2.0 cable is not supplied with this unit. Use a commercially-available generic USB cable conforming to USB2.0.
  If possible, we recommend using a cable with a length of 1.5 m (approx. 4.9 feet) or less.

About connecting to a TV

- Use a commercially-available High Speed HDMI cable. If possible, we recommend using a cable with a length of 3 m (approx. 9.8 feet) or less.

About using a headphone

- Excessive sound pressure from earphones and headphones can cause hearing loss.
- Listening at full volume for long periods may damage the user's ears.

■ Caution regarding the lens and the viewfinder

Do not aim the lens or the viewfinder at the sun or strong light. Doing so may cause the unit to malfunction.

■ Batteries that may be used with this product (As of January 2020)

Panasonic AG-VBR59/VW-VBD58 batteries may be used with this product.

It has been found that counterfeit battery packs which look very similar to the genuine product are made available to purchase in some markets. Some of these battery packs are not adequately protected with internal protection to meet the requirements of appropriate safety standards. There is a possibility that these battery packs may lead to fire or explosion. Please be advised that we are not liable for any accident or failure occurring as a result of use of a counterfeit battery pack. To ensure that safe products are used we would recommend that a genuine Panasonic battery pack is used.

■ The symbols on this product (including the accessories) represent the following:

~	AC
⎓	DC
|	ON
⏻	Standby
⧈	Class II equipment (The construction of the product is double-insulated.)

Trademark

- SDXC logo is a trademark of SD-3C, LLC.
- “AVCHD”, “AVCHD Progressive” and the “AVCHD Progressive” logo are trademarks of Panasonic Corporation and Sony Corporation.
- Manufactured under license from Dolby Laboratories. Dolby, Dolby Audio, and the double-D symbol are trademarks of Dolby Laboratories.
- The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing Administrator, Inc. in the United States and other countries.
- LEICA is a registered trademark of Leica Microsystems IR GmbH and DICOMAR is a registered trademark of Leica Camera AG.
- Screenshots are used according to Microsoft Corporation guidelines.
- iPhone and iPad are trademarks of Apple Inc. registered in the U.S. and/or other countries.
- Google, Android and Google Play are trademarks of Google LLC.
- The Wi-Fi CERTIFIED™ Logo is a certification mark of Wi-Fi Alliance®.
- The Wi-Fi Protected Setup™ Logo is a certification mark of Wi-Fi Alliance®.
- “Wi-Fi®” is a registered trademark of Wi-Fi Alliance®.
- “Wi-Fi Protected Setup™”, “WPA™”, and “WPA2™” are trademarks of Wi-Fi Alliance®.
- All other names, company names, product names, etc., contained in this instruction manual are trademarks or registered trademarks of their respective owners.

License

This product is licensed under the AVC Patent Portfolio License for the personal use of a consumer or other uses in which it does not receive remuneration to (i) encode video in compliance with the AVC Standard (“AVC Video”) and/or (ii) decode AVC Video that was encoded by a consumer engaged in a personal activity and/or was obtained from a video provider licensed to provide AVC Video. No license is granted or shall be implied for any other use. Additional information may be obtained from MPEG LA, L.L.C.
See http://www.mpegla.com

- Separate license contract with MPEG-LA is required to record in a memory card with this product and to distribute that card to end users for a profit. The end user mentioned here indicates a person or organization that handles contents for a personal use.

Software information about this product

This product incorporates the following software:
(1) the software developed independently by or for Panasonic Corporation,
(2) the software owned by third party and licensed to Panasonic Corporation,
(3) the software licensed under the GNU General Public License, Version 2.0 (GPL V2.0),
(4) the software licensed under the GNU LESSER General Public License, Version 2.1 (LGPL V2.1), and/or
(5) open source software other than the software licensed under the GPL V2.0 and/or LGPL V2.1.

The software categorized as (3) - (5) are distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY, without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
For details, refer to the terms of license that are displayed using the following method:

1) Select the [OTHERS] menu → [USB DEVICE] → [SERVICE MODE] → [YES].
   Select “LICENSE.TXT” in the external drive recognized by the computer.

At least three (3) years from delivery of this product, Panasonic will give to any third party who contacts us at the contact information provided below, for a charge no more than our cost of physically performing source code distribution, a complete machine-readable copy of the corresponding source code covered under GPL V2.0 or LGPL V2.1, as well as the respective copyright notice thereof.
Contact Information: oss-cd-request@gg.jp.panasonic.com

The source code and the copyright notice are also available for free in our website below.
https://panasonic.net/cns/oss/index.html

How to read this document

■ Models described in this owner's manual

- This document describes the operation of models HC-X1500 and HC-X2000.
- The illustrations of the products, menu screens, etc., may differ from the actual items. Unless specifically stated otherwise, screen depictions and illustrations of the unit are of HC-X2000.
- The functionalities of the models differ. Be aware that the part numbers for the models that support the functions are shown.
- Not all models may be available depending on the region of purchase.
- Model numbers are abbreviated as follows in this owner's manual:

Model number	Abbreviation used in this owner's manual	
HC-X1500	X1500	[X1500]
HC-X2000	X2000	[X2000]

■ Conventions used in this manual

- Words and phrases in [ ] brackets indicate content displayed in the LCD monitor.
- Words and phrases in < > brackets indicate design text used on this unit, such as button names.

■ Reference pages

- Reference pages in this document are indicated by (➜ 00).

■ Terminology

- The battery pack is described as "battery".
- SDHC memory card, and SDXC memory card are referred to as "SD card" or "memory card" unless distinguished otherwise.
- Images created with one recording operation are referred to as a "clip".

Contents

Safety Precautions 2
Before using the unit 13
Accessories/Optional accessories ... 19
Accessories 19
Optional accessories 20
When turning on the power for the first time 21
[TIME ZONE] 21
[CLOCK SETTING] 21
What you can do with this unit 22
Recording to the memory card 22
Linking to external devices 22
Connecting to the network 23
Description of parts 24
Main unit 24
Handle unit ([X2000] supplied, [X1500] optional: VW-HU1) 29
Power supply 31
Attaching and removing the battery 31
Charging the battery 32
Attaching accessories 34
Adjusting the grip belt 34
Attaching the eye cup 35
Attaching the handle unit ([X2000] supplied, [X1500] optional) 35
Preparing the memory card 38
Memory cards supported by the unit 38
Inserting/removing the memory card 39
Turning on/off the power 40
Turning the unit on and off with the power button 40
Turning the unit on and off with the LCD monitor/viewfinder 40
Basic operation of the menu 41
Configuration of the menu 41
Formatting the memory card 42
Menu list 42
Manual recording 45
Rear ring function settings 46
Focusing (manual focus) 47
White balance adjustment 47
Gain 49
Setting the shutter speed 49
Playing back clips 50
Updating the unit's firmware 51
Specifications 52
General 52
Camera 52
Memory card recorder 54
Digital video 55
Digital audio 55
Streaming 56
Wi-Fi 56
Video output 56
Audio input 57
Audio output 57
Other input/output 57
Monitor 57
Handle unit ([X2000] supplied, [X1500] optional) 58
AC adaptor 58
Battery pack (AG-VBR59) 58
Limited Warranty (ONLY FOR U.S.A.) 59
Warranty (For Canadian Customers) 61
Useful Information (Only For Latin American Countries) 62

Before using the unit

■ Before using the unit, always check if the built-in battery is not consumed, and then set the date/time.

The date of the internal clock of the unit resets to January 1, 2020 if the built-in battery is exhausted. This may result in the meta data of the clip not being recorded correctly, and it may not display correctly in the thumbnail screen.

Connect the AC adaptor to the main unit or attach a battery when recharging the built-in battery.

The date/time set on the main unit is maintained for approximately 6 months when left in this state for approximately 24 hours.

(Recharged even when the power is on.)

For details about setting the time zone and date/time, refer to [TIME ZONE] (➜ 21) and [CLOCK SETTING] (➜ 21).

■ When using this product during rain or snow or when at the beach, be careful that water does not get inside the camera.

Water causes damage to the camera and memory card. (Repair may be impossible)

■ Take care so sand and/or dust do not get inside the camera when using it at the beach, etc.

Sand and dust may damage the camera and memory card. (Be careful when inserting or removing the memory card)

■ AC adaptor and battery

- It may take more time to charge or may not be able to charge when the temperature of the battery is extremely high or extremely low.
- Noise may be generated in radio when the unit is used close to a radio (especially when receiving AM). Keep a distance of 1 m (approx. 3.3 feet) or more when using.
- Oscillating sound may generate inside the AC adaptor during the use, but this is not a malfunction.
- Always disconnect the power plug from the power outlet after the use. (Power of approximately 0.1 W is consumed by the AC power itself if kept connected)
- Do not get the terminal section of the AC adaptor, or the battery dirty. Install the device close to the power outlet so the disconnection device (power plug) can be easily reached.

■ Charging lamp during charging

When the charging lamp is flashing, the following should be considered.

Flashing with approx. 4 second period (on for approx. 2 seconds, off for approx. 2 seconds):

- When the battery is over discharged or the temperature of the battery is too high or low. It can be charged, but it may take a few hours to complete the charging normally.

- Once normal charging starts, the charging lamp lights up green. However, depending on the conditions of use, even when normal charging is taking place, the charging lamp may keep flashing in approx. 4 second intervals until charging is completed.

Flashing with approx. 0.5 second period (on for approx. 0.25 second, off for approx. 0.25 second):

- The battery is not charged. Remove the battery from the unit, and try charging again.
- Check that the terminals of the unit or battery are not dirty or covered with a foreign object, and connect the battery correctly once again.
  If a foreign object or dirt is present, turn off the unit before removing.
- The battery or environment is at an extremely high or low temperature. Wait until the temperature has returned to an appropriate level and try charging again. If you are still unable to charge, there may be a fault in the main unit, battery or AC adaptor.

Off:

- Charging has finished.
- If the status indicator stays off despite the charging being unfinished, there may be a fault in the unit, battery or AC adaptor.
- If the operating time is very short even after the battery has been recharged, the battery has worn out. Please purchase a new battery.

■ Memory cards

- The surface of this unit or the memory card may get slightly hot when used for a long period of time, but this is not a malfunction.
- The amount of memory included on the label of the memory card is the total amount of memory below.
  – Capacity to protect and manage copyright
  – Capacity usable as the normal memory on the unit or a PC.
- Do not give a strong impact to, bend, or drop the memory card.
- Memory card data may become destroyed or erased in the following cases.
  – Electrical noise or static electricity
  – Malfunction of the unit or the memory card
- Do not perform the following operations when accessing the memory card (the card 1 access lamp/card 2 access lamp is flashing in orange).
  – Removing the memory card
  – Disconnecting battery or the AC adaptor without turning off the main unit
  – Apply vibration of impact

■ Take care not to drop the main unit when carrying the camera.

- Strong impact will damage the main unit, and it may not operate properly.
- Hold the handle* or grip when carrying the camera, and handle it carefully.

* The handle can be used when the handle unit (X2000 supplied, X1500 optional) is attached.

■ Do not apply insecticide or volatile material to the camera.

- The main unit may deform or the paint may peel off when insecticide or volatile material is applied.

■ **Do not allow the camera to remain in contact with a rubber or vinyl object for a long period of time.**

■ **Disconnect the battery or disconnect the AC cable from the power outlet after the use.**

■ **Battery characteristics**

The battery is a rechargeable lithium-ion battery. It produces electrical energy via an internal chemical reaction. This chemical reaction is effected by the ambient temperature and humidity. The usable time of the battery becomes shorter when the temperature gets higher or lower. When used in an environment with extremely low temperature, it can only be used for approximately 5 minutes.

When the battery is in an extremely hot environment, its protective function will operate and the unit cannot be used temporarily.

■ **After using the unit, be sure to remove the battery.**

Securely remove the battery from the camera.

(Minute current is consumed even if the camera is turned off when the battery is left attached)

The battery will become over discharge and may become unusable even if it is recharged when the battery is left attached for long period of time.

Do not remove the battery when the power is turned on.

Turn off the power and remove the battery after the operation lamp goes completely out.

■ **Take proper care of the battery terminal.**

Do not allow dust or foreign objects on the battery terminal.

Confirm that the battery and its terminal section is not deformed when the battery is dropped by mistake.

Do not mount a deformed battery to the camera. This may damage the camera.

■ **Cautions when throwing memory cards away or transferring them to others**

Formatting memory cards or deleting data using the functions of the unit or a computer will merely change the file management information: it will not completely erase the data on the cards.

It is recommended to completely erase the data in following method when discarding/ conveying.

- Physically destroy the memory card itself
- Completely erase the data in the memory card using a commercially available data erasing software for PC, etc.

Users are responsible for managing the data stored in their memory card.

■ LCD monitor and viewfinder

- Condensation sometimes forms on the LCD panel of the LCD monitor in locations subject to extreme temperature differences. If this happens, wipe with a soft, dry cloth.
- Do not touch the LCD monitor with your finger nails, or rub or press with strong force.
- The LCD monitor will be slightly darker than normal immediately after the power is turned on when the camera is very cold. It will return to its regular brightness when the internal temperature increases.
- The LCD monitor and viewfinder are managed with high precision so that at least 99.99% of the dots are effective pixels and 0.01% or less are invalid pixels and always lit. This is not a malfunction and it has no effect whatsoever on the recorded images.
- It may become difficult to see or difficult to recognize the touch when a LCD protection sheet is affixed.

■ About Condensation (When the lens, the viewfinder or LCD Monitor is fogged up)

Condensation occurs when there is a change in temperature or humidity, such as when the unit is taken from outside or a cold room to a warm room. Please be careful, as it may cause the lens, the viewfinder or LCD monitor to become soiled, moldy, or damaged.

When taking the unit to a place which has a different temperature, if the unit is accustomed to the room temperature of the destination for about 1 hour, condensation can be prevented. (When the difference in temperature is severe, place the unit in a plastic bag or the like, remove air from the bag, and seal the bag.)

When condensation has occurred, remove the battery and/or the AC adaptor and leave the unit like that for about 1 hour. When the unit becomes accustomed to the surrounding temperature, fogginess will disappear naturally.

■ Caution regarding laser beams

The MOS sensor may be damaged if the MOS sensor is subjected to light from a laser beam.

Take sufficient care to prevent laser beams from striking the lens when shooting in an environment where laser devices are used.

■ Treatment of clips

Clips recorded with devices other than this unit are not supported by this unit.

■ Regarding system frequencies

You can change the system frequency (59.94 Hz/50.00 Hz) for this unit by using the menu.

- When AVCHD clips are recorded, it is not possible to use the same memory card with different system frequencies. When the system frequency is changed, use a different memory card.

■ Note the following points.

- If you prepare to record important images, always shoot some advance test footage to verify that both pictures and sound are being recorded normally.
- Panasonic will not assume liability when video or audio recording fails due to a malfunction of the unit or the memory card during the use.
- Set the calendar (datetime of the internal clock) and the time zone, or check the setting before recording. This will have an effect on the management of the recorded contents.

■ Exemption of liability

Panasonic is not liable in any way regarding following.

1. **Incidental, special, or consequential damages caused directly or indirectly by the unit**
2. **Damages, breakage of the unit, etc., caused by misuse or carelessness of the customer**
3. **When disassembly, repair, or modification of the unit is performed by the customer**
4. **Inconveniences, damnification, or damages by not being able to record and/or display the video due to any reasons including failure or malfunction of the unit**
5. **Inconveniences, damnification, or damages resulting from malfunction of the system combining with any third party equipment**
6. **A liability claim or any claim for a privacy violation by an individual or a group that was the subject of the video that the customer has shot (including recording) that became public by any reason (including using with the network user authentication turned OFF)**
7. **The registered information is lost due to any reason (including initializing this unit because the authentication information such as user name or password is forgotten)**

■ Cautions regarding network

Since this unit is used connected to a network, following mischief may occur.

1. **Leaking or divulging of information through the unit**
2. **Fraudulent operation of the unit by a malicious third party**
3. **Obstruction and/or stopping of the unit by a malicious third party**

It is customer's responsibility to take sufficient network security measures including the following to prevent damage caused by such mischief. Please note that Panasonic is not liable in any way for damage caused by such mischief.

- Use the unit on a network where safety is secured by using a firewall, etc.
- When using the unit on a system where a PC is connected, make sure that checking and cleaning of infection by computer virus and malicious program is performed periodically.
- In order to prevent malicious attacks, use the authentication system and change the default setting values by using 8 characters or more including 3 or more character types for the authentication information (such as user name and password) so that a third party cannot guess your authentication information.

- Store the authentication information (user name, password, etc.) appropriately so it is not visible to the third party.
- Periodically change the authentication information (user name, password, etc.) and do not use the same authentication information as other accounts.
- To prevent the setting information in the unit to leak to the network, execute measure such as restricting the access with user authentication, etc.
- Do not install in a location where the unit, cable, etc., can be easily damaged.

■ Security

Take caution so the unit or memory card is not stolen, lost, or neglected. Note that Panasonic is not liable to leakage, falsification, or loss of information caused by them.

■ When requesting repairs, or when transferring ownership/disposing of the product

- After first taking note of personal information, make sure you delete information in this unit that includes personal information, including the wireless LAN connection settings, etc., that you have registered or set in this unit, using the following menu settings:
  – [NETWORK] menu → [UTILITY] → [NETWORK INITIALIZE]
  – [OTHERS] menu → [MENU INITIALIZE]
- Remove the Memory Card from this unit when requesting a repair.
- Settings may return to factory default when this unit is repaired.
- Please contact the dealer where you purchased this unit or Panasonic if above operations are not possible due to malfunction.
- (For the X2000)
  When requesting a repair for the handle unit, request a repair for the video camera as well, as the cause of the problem may be in the video camera.

Accessories/Optional accessories

Accessories

For details about procedures such as mounting accessories, refer to the corresponding descriptions in “Chapter 1 Overview” → “Accessories” of Owner’s Manual (PDF version).

Check the accessories before using this unit.

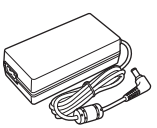
Product numbers correct as of January 2020. These may be subject to change.

Battery pack (➜ 31)

AG-VBR59

AC adaptor (➜ 32)

SAE0011A



AC cable (➜ 32)

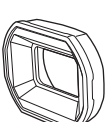
- For AC adaptor

K2CA2YY00259

Lens hood

DVYE1189Z

- Pre-attached to the main unit.



Eye cup (➜ 35)

DVZE1040Z

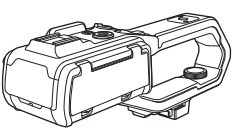
■ **For the** X2000

The following accessories are also supplied.

Handle unit (➜ 29)

VW-HU1

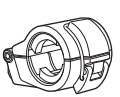
- To purchase as a supplied accessory, use part number 1KC1VWHU1PPK when ordering.



1AC2HCX2500Z

Microphone holder

- The microphone holder mounting screws are supplied with the microphone holder.



Microphone holder mounting screws

1PP1HCX2500Z

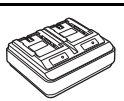
- Length 12 mm (0.47 ″) (×2)

NOTE

- Appropriately discard the AC cable cap (if attached) and packing materials after taking the product out.

Optional accessories

Some optional accessories may not be available in some countries.

Accessory No.	Figure	Description
AG-MC200G*		Unidirectional microphone
VW-VMS10PP		Stereo microphone
AG-BRD50		Battery charger
VW-VBD58		Battery pack
AG-VBR59		Battery pack
VW-LED1PP		LED video light
VW-HU1		Handle unit

* Handle unit (X2000 supplied, X1500 optional (VW-HU1)) required.

(For U.S.A. only)
To order optional accessories please visit http://shop.panasonic.com
or your local Photo Specialty Dealer.

NOTE:

Accessories and/or model numbers may vary by country. Please consult your local dealer.
Product numbers correct as of January 2020. These may be subject to change.

When turning on the power for the first time

The time zone, date, and time are not set when the unit is shipped.

[TIME ZONE] is displayed in the LCD monitor when the power is turned on for the first time.

Follow the guidance and make the settings in the order of [TIME ZONE] and then [CLOCK SETTING].

- You can do these operations either with the multidial or by touching the LCD monitor.

[TIME ZONE]

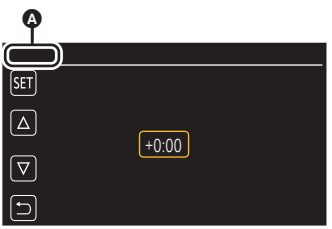
Set the time difference from the Greenwich Mean Time.

Ⓐ [TIME ZONE]

1 Set the time difference.

2 Select [SET].

Once the setting for [TIME ZONE] is completed, the [CLOCK SETTING] screen is displayed.



NOTE

- The setting for the date/time of the main unit changes together with the time zone settings.
- This can also be set with the [OTHERS] menu → [CLOCK] → [TIME ZONE].

[CLOCK SETTING]

Set the year, month, date, and time.

Ⓐ [CLOCK SETTING]

Ⓑ 0 : 0 JAN. 1. 2020

1 Set the year, month, date, and time.

The year can be set between 2018 and 2037.

2 Select [SET].

Once the setting is complete, the camera image screen is displayed.

NOTE

- This can also be set with the [OTHERS] menu → [CLOCK] → [CLOCK SETTING].

What you can do with this unit

Recording to the memory card

Recording in following types is possible.

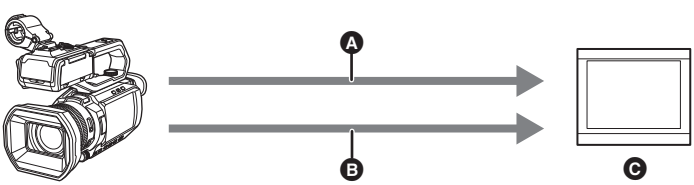
- MOV recording (UHD and FHD recording)
- MP4 recording (UHD and FHD recording)
- AVCHD recording
- Simultaneous recording
- Relay recording
- Interval recording
- Background recording
- Pre-recording

Linking to external devices

Connecting to TV/monitor

Connect to a TV/monitor and output images.

- When using X2000 use a BNC cable (<SDI OUT> terminal) to connect a TV/monitor.



A HDMI cable
B (For the X2000)
BNC cable (<SDI OUT> terminal)
C TV/Monitor

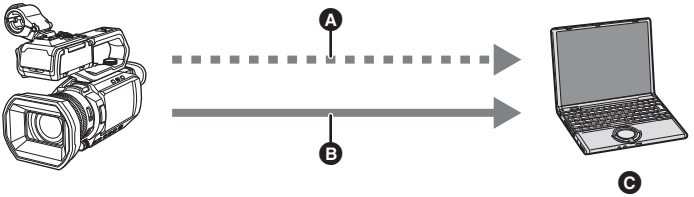
- Use a commercially-available High Speed HDMI cable. If possible, we recommend using a cable with a length of 3 m (approx. 9.8 feet) or less.
- (For the X2000)
Use a commercially-available 5C-FB or equivalent double-shielded cable for the BNC cable.

When using a DVI converter, etc., to connect an HDMI cable to this unit, make sure that you connect last to the <HDMI> terminal on this unit. Connecting first to the <HDMI> terminal on this unit may cause a malfunction.

Card reader mode

Data (files) for performing nonlinear editing on a computer are transferred.

- The unit supports USB2.0.



- A Memory card*1
- B USB2.0 cable*2
- C Computer

*1 Memory cards are optionally available. They are not supplied with the unit.

*2 A USB2.0 cable is not supplied with the unit.
Use a commercially-available generic USB cable conforming to USB2.0. If possible, we recommend using a cable with a length of 1.5 m (approx. 4.9 feet) or less.
The unit does not offer a bus-powered function.

Connecting to the network

This unit is equipped with wireless LAN. It can connect to wireless LAN devices via a network.

Available functions

When the unit is connected to a network, the following functions are available.

- Connecting to HC ROP app

You can remotely control this unit with the HC ROP app by connecting this unit with an iPhone/iPad or Android terminal via wireless LAN.

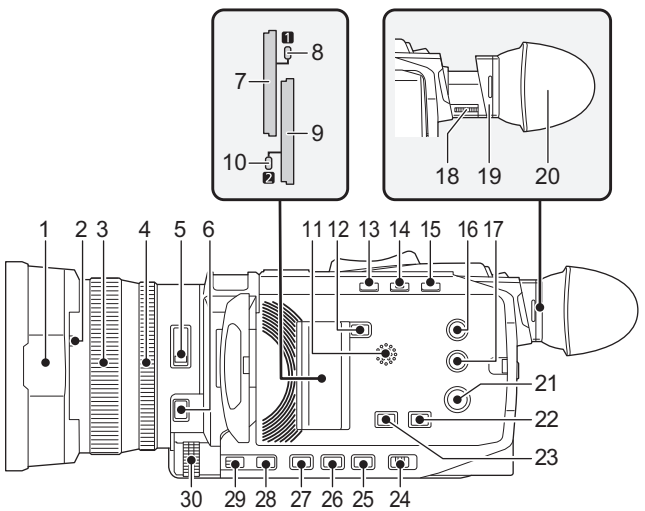
- Streaming function

You can perform streaming of audio and video currently shot with the unit over a network (wireless LAN).

Description of parts

Main unit

- The illustrations in this document show the handle unit (X2000 supplied, X1500 optional) removed.



1 **Lens hood**

2 **Lens cover switching lever**
Opens/closes the lens cover.

3 **Focus ring (➜ 47)**
When the <FOCUS A/M/∞> button is pressed to set to manual focus mode ([MF]) you can focus manually.

4 **Rear ring (➜ 46)**
You can manually perform zoom operations, adjust the iris (the lens stop), and adjust the AE level (exposure compensation).
- You can switch the function to be adjusted by setting with the menu, pressing the USER button assigned to [REAR RING], or touching the USER button icon.

5 **<ND FILTER> switch**
Selects the ND filter to suit the illumination of the subject.
<1/64>:
Reduces the amount of light entering the MOS sensor to 1/64.
<1/16>:
Reduces the amount of light entering the MOS sensor to 1/16.
<1/4>:
Reduces the amount of light entering the MOS sensor to 1/4.
<CLR>:
Does not use the ND filter.

6 **<FOCUS A/M/∞> button (➜ 47)**
Select the focus function.

7 Card slot 1 (➜ 39)
A slot for the memory card.

8 Card 1 access lamp
Indicates the access status for recording and playback of the memory card inserted in card slot 1.

9 Card slot 2 (➜ 39)
A slot for the memory card.

10 Card 2 access lamp
Indicates the access status for recording and playback of the memory card inserted in card slot 2.

11 Built-in speaker
Outputs audio during playback.
Audio is not output from the built-in speaker when headphones are connected to the headphone terminal.

12 <SLOT SEL> button
Selects the card slot to record to or play back from.

13 <USER1> button
Used as a USER button (USER1).
- [LEVEL GAUGE] is allocated at the time of purchase.
  Switches display/hide of level gauge.

14 <USER2> button
Used as a USER button (USER2).
- [BACKLIGHT] is allocated at the time of purchase.
  Switches enable/disable of the auto iris control function for backlight compensation.

15 <O.I.S.>/<USER3> button
Switches enable/disable of the optical image stabilizer function.
This is also used as the USER button (USER3).

16 <THUMBNAIL> button (➜ 50)
Press the button to switch between the camera image screen and the thumbnail screen.

17 <DISP/MODE CHK> button
Switches display/hide of information other than the time counter, time stamp, zebra pattern, and marker.
Press and hold the button to display information about the settings of the various shooting functions and information such as a list of the functions assigned to the USER button. Each press of the button switches the information page in order.

18 Diopter adjustment dial
Adjusts the diopter scale so that the viewfinder screen can be viewed clearly.

19 Eyepiece
Do not leave the eyepiece pointed toward the sun. Doing so might damage the devices inside.

20 Eye cup (➜ 35)

21 Power button (➜ 40)
Press the button to switch the power on/off.

22 <WHITE BAL> button (➜ 47)
Selects the method for adjustment of the white balance.

23 <AE LEVEL>/<USER4> button (➜ 47)
Switches enable/disable of the AE level function.
Set the target value of the AE level in the [SCENE FILE] menu → [AE LEVEL EFFECT].
This is also used as the USER button (USER4).

24 <AUTO/MANU> switch (➜ 45)
Selects the method to adjust the focus, gain, iris, white balance, and shutter speed at shooting.
<AUTO>:
Adjusts automatically. (Auto mode)
<MANU>:
Adjusts manually. (Manual mode)

25 <SHUTTER> button (➜ 49)
Switches the shutter mode.

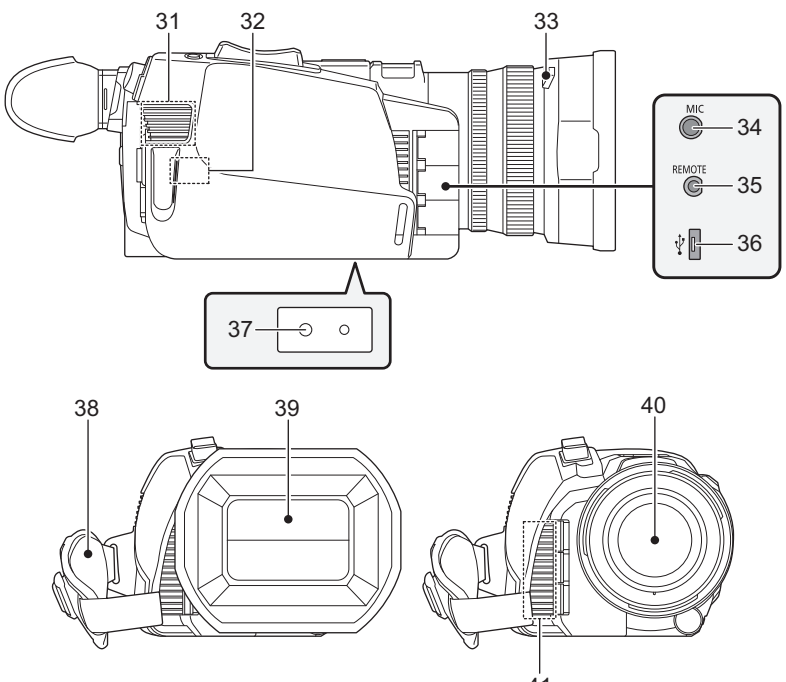
26 **<GAIN> button (➜ 49)**
Selects the method for adjusting screen brightness.

27 **<IRIS> button (➜ 46)**
Selects the method for adjustment of the lens stop.

28 **<MENU> button (➜ 41)**
Displays the menu. Pressing the <MENU> button while the menu is displayed closes the menu.
Press the button while the thumbnail screen is displayed to display the operation screen of the thumbnail menu, and clips can be deleted.

29 **<EXIT> button**
Returns to one level higher when the menu is displayed. Pressing the <EXIT> button without confirming the setting value will not reflect the change in the setting.

30 **Multidial (➜ 45)**
Moves, selects, and sets the menu while the menu is displayed.
Use the multidial to also operate thumbnails, select the multi manual function and select/set the various operation icons.



31 **Fan inlet**
Fan inlet for cooling fan. Do not block this while the unit is being used.

32 **Wireless LAN Transmitter**

33 **Lens hood release button**

34 **<MIC> terminal**
Connect an external microphone (stereo mini jack).

35 <REMOTE> terminal
Connects the remote control unit (commercially-available) to control some functions remotely.

36 USB terminal
Connect to a computer with the USB2.0 cable to transfer data.

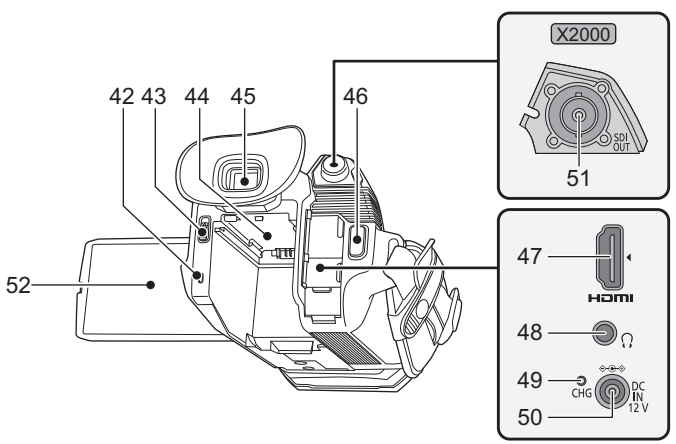
37 Tripod mounting holes
Attach the tripod. (bottom)
- Mounting hole size
  - 1/4-20 UNC (screw length 5.5 mm (0.22 ″) or shorter)
- Attaching a tripod with a screw length of 5.5 mm (0.22 ″) or more may damage the unit.

38 Grip belt (➜ 34)

39 Lens cover

40 Lens

41 Fan outlet
Fan outlet for cooling fan. Do not block this while the unit is being used.



42 Status indicator (➜ 40)
Illuminates when power is on.

43 Battery release lever (➜ 31)
Used when removing the battery from the main unit.

44 Battery mounting section (➜ 31)
Attaches a battery.

45 Viewfinder

46 REC button (on the grip)
Starts or stops the recording.
It is possible to directly record from the thumbnail mode.

47 <HDMI> terminal
A terminal to output video signal by connecting a monitor, etc.

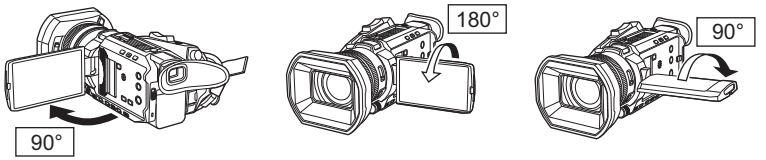
48 Headphones terminal
Connects audio monitoring headphones.

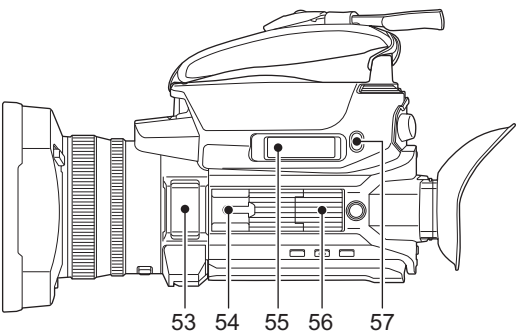
49 Charging lamp (➜ 32)
Illuminates when the battery is charging.

50 <DC IN 12V> terminal (➜ 32)
Connects the supplied AC adaptor and supplies an external power.

51 (For the X2000)
<SDI OUT> terminal
A terminal to output SDI signal by connecting a monitor, etc.

52 LCD monitor





53 Built-in microphone
This is the built-in stereo microphone <L>/<R>.

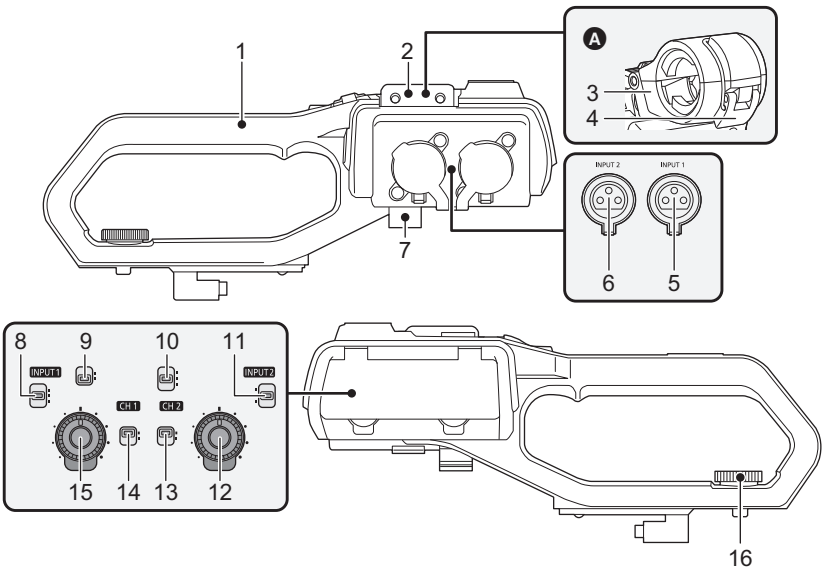
54 Accessory shoe (on the main unit)
Attach a video light, etc.

55 Zoom lever (on the grip)
Adjusts the zoom of an image.
<T>: Zooms in the image.
<W>: Zooms out the image.
- Adjust the volume when playing back clips.

56 Handle unit mounting section (➜ 35)

57 <USER5> button
Used as a USER button (USER5).
- [REC CHECK] is set at the time of purchase.
  Automatically plays back the last approximately 3 seconds of the previously shot clip.

Handle unit ([X2000] supplied, [X1500] optional: VW-HU1)



A With a microphone holder attached

1 Handle

2 Microphone holder mounting section (➜ 35)
Attaches the supplied microphone holder with the microphone holder mounting screws.

3 Microphone holder (➜ 35)
Secures the external microphone in place.

4 Buckle
Used to open and close the microphone holder.

5 <INPUT 1> terminal (XLR, 3-pin)
Connects an audio equipment or an external microphone.

6 <INPUT 2> terminal (XLR, 3-pin)
Connects an audio equipment or an external microphone.

7 Microphone cable clamp
Fixes the external microphone cable.

8 <INPUT1> switch
Switches audio input signals connected to the <INPUT 1> terminal.

9 CH1 SELECT switch
Selects the audio to be recorded on audio channel 1.

10 CH2 SELECT switch
Selects the audio to be recorded on audio channel 2.

11 <INPUT2> switch
Switches audio input signals connected to the <INPUT 2> terminal.

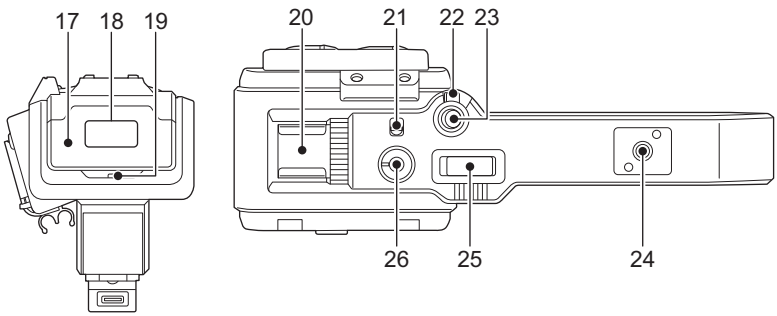
12 <AUDIO LEVEL CH2> dial
Adjust the recording level of audio channel 2.

13 <CH2> switch
Selects how the recording level for audio channel 2 is adjusted.

14 <CH1> switch
Selects how the recording level for audio channel 1 is adjusted.

15 <AUDIO LEVEL CH1> dial
Adjust the recording level of audio channel 1.

16 Handle unit mounting screw (➜ 35)
Secures the handle unit to the main unit.



17 Light cover
- Keep the light cover out of reach of children to prevent swallowing.

18 Built-in LED light

19 Tally lamp
Illuminates when the recording is started. Flashes when the battery level becomes low.
Whether or not to illuminate the lamp can be set in the menu.

20 Accessory shoe (on the handle)
Attach a video light, etc.

21 <LIGHT> switch
Switches the built-in LED light on/off.

22 Hold lever
Disables the REC button (on the handle) when switched to <HOLD>.

23 REC button (on the handle)
Starts or stops the recording.

24 Accessory mounting hole
Accessories can be attached.
- Mounting hole size
  - 1/4-20 UNC (screw length 5.5 mm (0.22 ″) or shorter)

25 Zoom lever (on the handle)
Adjust the zoom of an image.
<T>: Zooms in the image.
<W>: Zooms out the image.

26 Light dimmer dial
Adjusts the brightness of the built-in LED light.
Turn to <+> to brighten, turn to <−> to dim.

Power supply

A battery or the supplied AC adaptor can be used as the power supply for the unit.

- The unit is compatible to following batteries. (As of January 2020)
  - AG-VBR59 (supplied/optional, supports quick charging)
  - VW-VBD58 (optional)
- AG-VBR59 supports quick charging. Use a battery charger (AG-BRD50: optional) to perform quick charging.

Attaching and removing the battery

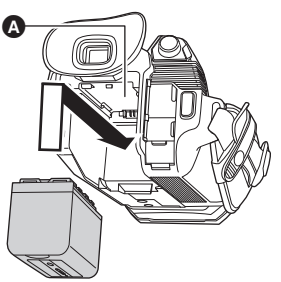
●Press the power button to turn off the unit. (➜ 40)

Attaching the battery

1 Push the battery against the battery mounting section on the main unit and slide forward to attach.

Press in the battery until it clicks and gets locked.

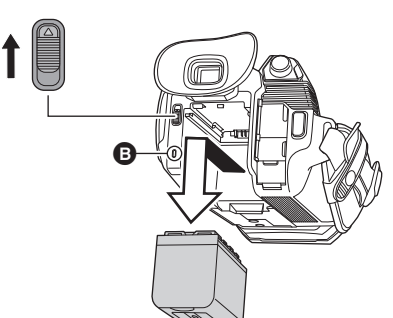
Ⓐ Battery mounting section



Removing the battery

Be sure to hold down the power button until the status indicator goes off. Then remove the battery while supporting the unit to prevent it from dropping.

Ⓑ Status indicator



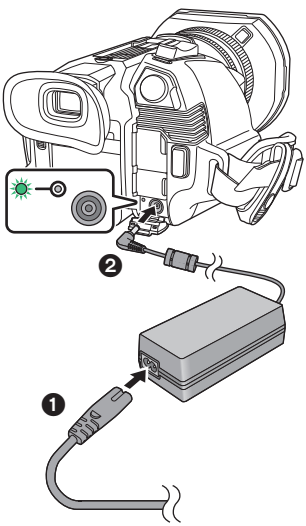
Move the battery release lever in the direction indicated by the arrow and remove the battery when unlocked.

Charging the battery

The battery is not charged at the time of purchase. Use only after charging sufficiently.

It is recommended that you have one extra battery.

- It is recommended to perform charging of the battery in a location with ambient temperature of 10 °C to 30 °C (50 °F to 86 °F) (same for the battery temperature).
- Use the supplied AC adaptor. Do not use the AC adaptor of another device.
- The supplied AC cable is dedicated for this unit. Do not use with any other device. Also, do not use AC cable from other device on this unit.
- The battery is not charged when the power is on.



1 Connect the AC cable to the AC adaptor and the AC outlet.

- Insert the plugs as far as they will go.

2 Connect the AC adaptor to the <DC IN 12V> terminal.

- As the charging lamp lights up green, charging starts. It will turn off when the charging is completed.
- If the charging lamp flashes, refer to page 13.
- The DC plug of the AC adaptor, depending on its angle, may block your view of the charging lamp. To check the charging lamp status, adjust the angle of the DC plug.

■ Connecting to the AC outlet

It is possible to use this unit with power supplied from the AC outlet by turning on the unit with the AC adaptor connected.

Even when you use the AC adaptor for recording images, keep the battery connected.

This allows you to continue the recording even if a power failure occurs or the AC adaptor is unplugged from the AC outlet by accident.

- The AC adaptor is in the standby condition when the mains plug is connected. The primary circuit is always “live” as long as the AC adaptor is connected to an electrical outlet.

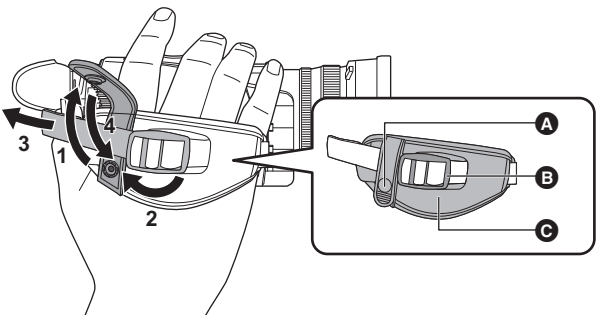
NOTE

- Do not use any other AC adaptors except the supplied one.
- We recommend using Panasonic batteries (➜ 31).
- If you use other batteries, we cannot guarantee the quality of this product.
- Do not heat or expose to flame.
- Do not leave the battery(ies) in a car exposed to direct sunlight for a long period of time with doors and windows closed.
- Do not expose to low air pressure at high altitudes.
- Do not expose to extremely low air pressure, as this may result in explosions or leakage of flammable liquids and gases.

Attaching accessories

Adjusting the grip belt

- Adjust the grip belt so that it fits the size of your hand.
- If the buckle is difficult to tighten, move the pad forward and tighten the buckle again.



Ⓐ Button
Ⓑ Buckle
Ⓒ Pad

1 Undo the button of the grip belt.

2 Open the buckle section.

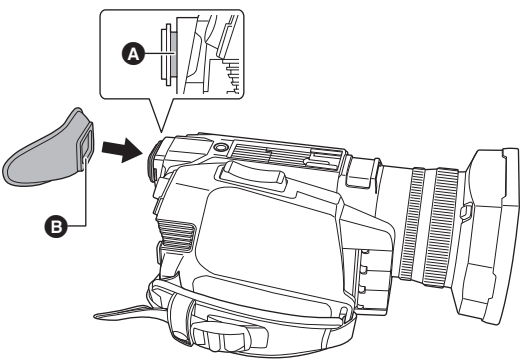
3 Pull the end of the belt.

4 Do up the button of the grip belt.

Attaching the eye cup

1 Attach the eye cup by aligning the groove on the mounting part of the eye cup with the inner ridge of the eye cup.

The illustration below is an example of attaching the eye cup to use it with your right eye. If you rotate the eye cup to the left by 180° before attaching it, you can use it with your left eye.



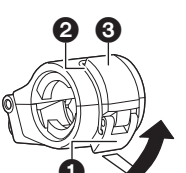
Ⓐ Groove
Ⓑ Ridge

Attaching the handle unit ([X2000] supplied, [X1500] optional)

●Press the power button to turn off the unit. (➜ 40)

1 Open the microphone holder.

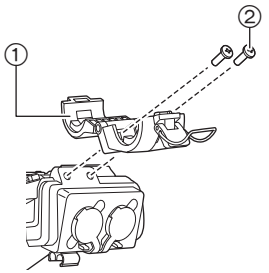
Open buckle ❶, and detach fitting ❷ from hook ❸.



2 Attach the microphone holder to the microphone holder mounting section on the handle unit.

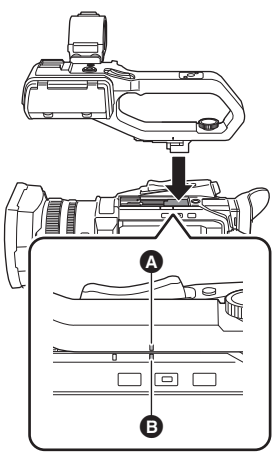
- Attach using a commercially-available screwdriver.
- There will be some rubbing noises with the rubber when screwing in the microphone holder mounting screws, but please ensure they are done up tightly.

① Microphone holder
② Microphone holder mounting screws



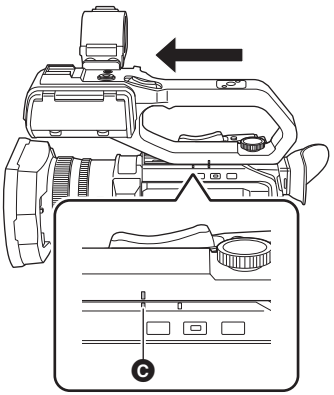
3 Push the handle unit into the handle unit mounting section on the camera.

Match the positions of mounting mark Ⓐ on the handle unit and mounting mark Ⓑ on the camera when pushing in.

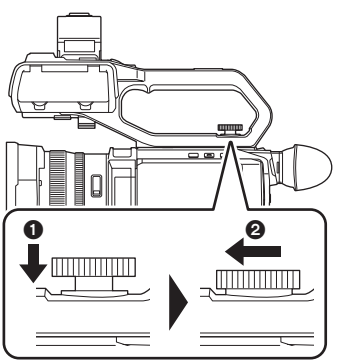


4 Slide the handle unit in the direction indicated by the arrow.

Slide up to mounting mark ❸.



5 While pressing the handle unit mounting screw down, turn it in the direction indicated by arrow ❷ until it stops.



■ **How to remove**

Remove by doing the steps for attaching in reverse.

NOTE

- Keep the microphone holder mounting screws out of reach of children to prevent swallowing.

Preparing the memory card

Memory cards supported by the unit

The SD cards can be used with the camera.

- Panasonic memory cards are recommended.
- Keep the memory card out of reach of children to prevent swallowing.

Speed Class during shooting

The memory card to use differs depending on the file format and the recording format. Use memory cards compatible with the Speed Class or UHS Speed Class.
The recording may stop suddenly when a memory card not compatible with the required Speed Class is used.
Speed Class and UHS Speed Class are the speed specification regarding continuous writing. Check the display on the label and other information on the memory card.

File format	Recording bit rate or recording function	Supported memory cards and Speed Classes	Example of card display
MOV/MP4	200 Mbps, 150 Mbps, 100 Mbps, Super slow recording	● SDXC memory card with UHS Speed Class 3	
	72 Mbps, 50 Mbps	● SDXC memory card with Speed Class 10	
AVCHD	All	● SD card with Speed Class 4 or better	

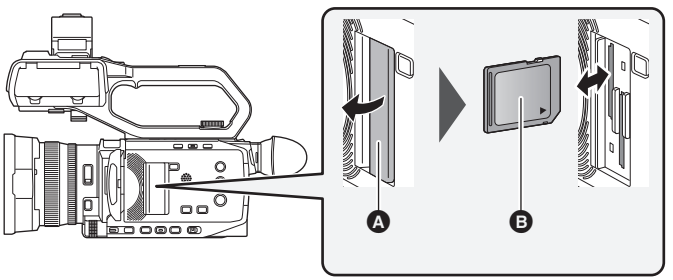
When the file format is MOV or MP4
- SDXC memory cards can be used. SDHC memory cards cannot be used.

Inserting/removing the memory card

Inserting the memory card

The memory card to use with the unit should always be formatted on the unit. (➜ 42)

- Formatting the memory card will erase all of the recorded data which cannot be restored.



Ⓐ Card slot cover
Ⓑ Label side

1 Open the card slot cover.

2 Insert the memory card into the card slot.

- Card slot 1 and card slot 2 can each insert one memory card.
- With the label facing in the direction indicated in the diagram, push in until there is a click.
  Do not force or apply excess force when inserting the memory card.

3 Close the card slot cover.

Removing the memory card

1 Open the card slot cover.

- Confirm that the card access lamp is not flashing in orange.
- Data is being written/loaded when the card access lamp is flashing in orange, so do not remove the memory card.

2 Press in the memory card further into the main unit and let go.

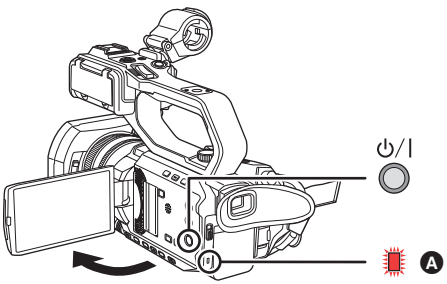
- Pull the memory card straight out when it is released from the card slot.

3 Close the card slot cover.

Turning on/off the power

Turning the unit on and off with the power button

1 Open the LCD monitor and press the power button to turn on the unit.



A The status indicator lights on.

■ To turn off the unit

Hold down the power button until the status indicator goes off.

NOTE

- The [TIME ZONE] screen is displayed when the power is turned on for the first time. (➜ 21) Set the time zone, date, and time.
- The built-in battery (rechargeable battery) will discharge. The setting for date/time may be initialized when the unit is not turned on for approximately 6 months. Set the date/time again after charging the built-in battery.

Turning the unit on and off with the LCD monitor/ viewfinder

Opening the LCD monitor or extending the viewfinder turns on the unit. Closing the LCD monitor/viewfinder turns off the unit.

During normal use, you may find it convenient to turn the unit on/off using the LCD monitor or viewfinder.

- The unit will not turn off unless the LCD monitor is closed and the viewfinder is retracted.
- The unit will not turn off during recording or while connected to a network even if the LCD monitor is closed and the viewfinder is retracted.
- In the following cases, opening the LCD monitor or extending the viewfinder does not turn on the unit. Press the power button to turn on the unit.
  - When the unit is originally purchased
  - When you have turned off the unit using the power button

Basic operation of the menu

The setting of the unit can be changed with the menu in accordance to the shooting scene or recording contents.

Set data is written and saved in the main unit memory.

- When you press the <MENU> button, the menu is displayed.
- There are 2 methods of operation: a method to operate with the multidial, or a method to touch the LCD monitor.

Configuration of the menu

[THUMBNAIL] menu	Performs confirmation or deleting of the recording clip. This menu can be set when the thumbnail screen is displayed.
[CAMERA] menu	Sets the basic functions of the camera. This menu cannot be set when the thumbnail screen is displayed.
[SCENE FILE] menu	Sets the setting regarding scene file. This menu sets the detailed image quality adjustment of the camera video. Also, selection of the scene file, writing the scene file data to the main unit memory, and loading from the main unit memory can be performed. This menu cannot be set when the thumbnail screen is displayed.
[AUDIO] menu	Sets the input/output function of audio.
[VIDEO OUT/LCD/VF] menu	Configures the settings for the external output, the information to display in the LCD monitor or viewfinder and the output format.
[RECORDING] menu	Sets the various items in the recording function.
[NETWORK] menu	Sets the setting regarding the network function.
[SYSTEM] menu	Configures the settings regarding the recording format of video and audio.
[OTHERS] menu	Configures the settings for writing/loading/initializing user files to the internal memory, and the basic unit settings.

Formatting the memory card

Before recording with a memory card that is to be used for the first time in this unit, format it.
All data will be deleted when the card is formatted. Save any important data to a computer, etc.
• When using 2 memory cards, you must format both of the memory cards.

1 Select the [RECORDING] menu → [FORMAT MEDIA] → [SLOT1]/[SLOT2].

2 When the confirmation message is displayed, select [SET].

3 When the completion message is displayed, select [⮌].

NOTE

- Do not turn this unit off or remove the memory card, while formatting. Do not expose the unit to vibrations or shock.
- This function can be operated also by touching the LCD monitor.
- It may take few seconds after closing the completion message until it can record.

Format the cards using this unit. (Do not format using other devices, such as a computer, etc. Doing so may make the cards unusable in this unit.)

Menu list

For details on specifications, visit the Owner's Manual (PDF version).

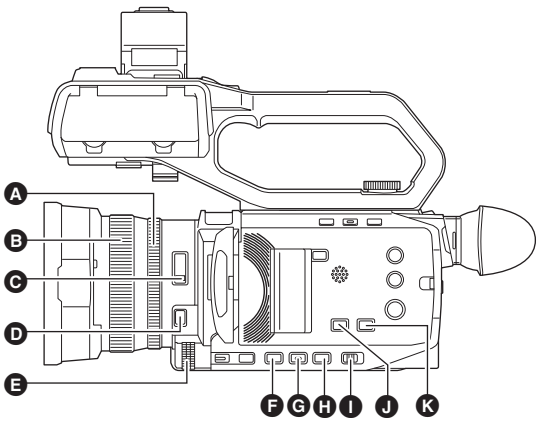
*1 This can be set when the handle unit (X2000 supplied, X1500 optional) is attached to the unit.
*2 This can be set when the handle unit has not been attached to the unit.
*3 Available for setting when using X2000 .

[THUMBNAIL] menu	[PLAYBACK]	[CLIP SEL], [RESUME PLAY]
	[CLIP]	[PROTECT], [DELETE], [COPY], [INFORMATION]
	[DISPLAY]	[DATA]
[CAMERA] menu	[SW MODE]	[ZOOM RING], [IRIS RING], [SUPER GAIN], [AGC LIMIT], [O.I.S.], [HYBRID O.I.S.], [O.I.S. MODE], [ATW], [ATW SPEED], [ATW TARGET R], [ATW TARGET B], [W.BAL PRESET], [W.BAL VAR], [H.ZOOM SPEED], [i.ZOOM], [REAR RING], [AUTO SLOW SHTR], [AF SPEED], [AREA MODE], [IR REC], [IR REC COLOR], [FACE DETECT/ TRACKING MODE]
	[USER SW]	[USER1] to [USER12]

[SCENE FILE] menu	[FILE SELECT], [NAME EDIT], [LOAD/SAVE/INITIALIZE], [MASTER DTL], [DTL CORING], [V.DTL LEVEL], [RB GAIN CONTROL SETTING], [CHROMA LEVEL], [CHROMA PHASE], [MATRIX], [COLOR CORRECTION], [SKIN TONE DTL.], [MASTER PED], [GAMMA MODE SEL], [BLACK GAMMA], [KNEE MODE], [DRS], [DRS EFFECT DEPTH], [NR CONTROL], [AE LEVEL], [AE LEVEL EFFECT]	
[AUDIO] menu	[HANDLE UNIT INPUT SETTING]*1	[INPUT1 MIC LEVEL], [INPUT2 MIC LEVEL], [INPUT1 LINE LEVEL], [INPUT2 LINE LEVEL]
	[MIC SETTING]*2	[CH1 LEVEL], [CH2 LEVEL], [CH1 LEVEL CONTROL], [CH2 LEVEL CONTROL]
	[INPUT SETTINGS]	[CH1 MIC LOWCUT], [CH2 MIC LOWCUT], [CH1 LIMITER], [CH2 LIMITER], [MIC LIMITER LINK]
	[OUTPUT SETTINGS]	[AUDIO OUT]
	[ALARM]	[BATTERY END], [MEDIA END], [WARNING]
[VIDEO OUT/LCD/VF] menu	[VIDEO OUT SEL]*3	
	[SDI OUT]*3	[OUT FORMAT], [SDI AUDIO GAIN CHG], [SDI REC REMOTE], [SDI OUT CHAR], [SDI OUT ZEBRA]
	[HDMI OUT]	[OUT FORMAT], [HDMI TC OUT], [HDMI REC REMOTE], [HDMI OUT CHAR], [HDMI OUT ZEBRA]
	[LCD]	[BRIGHTNESS], [COLOR LEVEL], [CONTRAST], [BACK LIGHT], [RED TINT], [BLUE TINT], [SELF SHOOT]
	[VF]	[BRIGHTNESS], [COLOR LEVEL], [CONTRAST], [RED TINT], [BLUE TINT], [VF COLOR]
	[INDICATOR]	[FULL AUTO], [SLOT1/2 STATUS], [2 SLOTS FUNC.], [STREAMING], [NETWORK], [BATTERY REMAIN], [REC FORMAT], [FRAME RATE], [CLIP NAME], [REC REMOTE], [REC MODE], [FBC], [DRS], [O.I.S.], [SCENE FILE], [AREA/FACE], [AUDIO LEVEL METER], [GAIN], [ND FILTER], [SHUTTER], [IRIS], [AE LEVEL], [ZOOM/FOCUS], [WHITE BALANCE], [FACE DETECTION], [DATE/TIME], [MULTI MANUAL], [D.ZOOM], [IR REC], [PLAYBACK STATUS]
	[MARKER]	[CENTER MARKER], [SAFETY MARKER], [FRAME MARKER]
	[FOCUS ASSIST]	[FOCUS ASSIST SW], [EXPAND MODE], [EXPAND VALUE], [PEAKING LEVEL], [PEAKING COLOR], [DETAIL], [DETAIL LEVEL], [DETAIL FREQ.]
	[EI ASSIST]	[ZEBRA], [ZEBRA1 DETECT], [ZEBRA2 DETECT], [ZEBRA2], [WFM MODE], [WFM TRANSPARENCE]

[VIDEO OUT/LCD/VF] menu	[LEVEL GAUGE]	[LEVEL GAUGE], [LEVEL GAUGE RESET]
[RECORDING] menu	[FORMAT MEDIA]	
	[CLIP NAME]	[CAM INDEX], [NEXT CARD COUNT]
	[2 SLOTS FUNC.], [PRE REC]	
	[REC FUNCTION]	[REC MODE], [INTERVAL TIME]
	[TC/UB]	[TC PRESET], [UB PRESET], [FREE/REC RUN], [DF/NDF], [UB MODE]
	[REC COUNTER], [TIME STAMP]	
[NETWORK] menu	[DEVICE SEL], [NETWORK FUNC]	
	[IP REMOTE]	[ENABLE/DISABLE], [USER ACCOUNT], [ACCOUNT LIST]
	[STREAMING]	[STREAMING FORMAT], [START TRIGGER], [CONNECTION INFO.], [RECEIVER URL], [RTSP PORT], [MULTICAST ADDRESS], [MULTICAST PORT], [LOAD (SD CARD)], [SAVE (SD CARD)], [START]
	[WLAN PROPERTY]	[TYPE], [SSID], [CHANNEL], [ENCRYPTION], [ENCRYPT KEY]
	[WLAN IPv4 SETTING]	[DHCP], [IP ADDRESS], [SUBNET MASK], [DEFAULT GATEWAY], [PRIMARY DNS], [SECONDARY DNS]
	[INFORMATION]	[STATUS]
	[UTILITY]	[NETWORK INITIALIZE]
[SYSTEM] menu	[FREQUENCY], [FILE FORMAT], [REC FORMAT], [SUPER SLOW]	
[OTHERS] menu	[FILE]	[SCENE FILE(SD CARD)], [SETUP FILE(SD CARD)], [SETUP FILE(MEMORY)], [SLOT FOR LOAD/SAVE]
	[HANDLE TALLY LED]	
	[CLOCK]	[CLOCK SETTING], [TIME ZONE], [DATE FORMAT]
	[USB DEVICE]	[CARD READER MODE], [SERVICE MODE]
	[INFORMATION]	[VERSION], [OPERATION TIME], [UPDATE]
	[ECO MODE]	[BATTERY], [AC], [NETWORK]
	[APPROVED REGULATION], [LANGUAGE], [MENU INITIALIZE]	

Manual recording



- Ⓐ Rear ring
- Ⓑ Focus ring
- Ⓒ <ND FILTER> switch
- Ⓓ <FOCUS A/M/∞> button
- Ⓔ Multidial
- Ⓕ <IRIS> button
- Ⓖ <GAIN> button
- Ⓗ <SHUTTER> button
- Ⓘ <AUTO/MANU> switch
- Ⓙ <AE LEVEL>/<USER4> button
- Ⓚ <WHITE BAL> button

■ About auto mode/manual mode

Switch between auto mode and manual mode with the <AUTO/MANU> switch.

<AUTO>: auto mode

- Focus, iris, gain, shutter, and white balance are automatically adjusted.

<MANU>: manual mode

- To adjust focus, iris, gain, shutter speed, and white balance manually, set the unit to manual mode.

NOTE

- The settings made in manual mode are not maintained for the following settings when you switch to auto mode:
  - Focus, lens stop, gain, shutter speed, white balance

■ Camera operations that are disabled in auto mode

- The following camera operations are disabled in auto mode:
  - <IRIS> button, <GAIN> button, <SHUTTER> button, <WHITE BAL> button, <FOCUS A/M/∞> button, focus ring, rear ring*

* When set with the [CAMERA] menu → [SW MODE] → [REAR RING] → [IRIS]

- The following USER button functions are disabled in auto mode:
  - [AWB]/[FBC]/[ONE PUSH AF]/[ATW]/[FOCUS ASSIST]

Rear ring function settings

Set the [CAMERA] menu → [SW MODE] → [REAR RING], and you can switch the function to be adjusted by the rear ring.

- Zoom
- Manual iris adjustment
- AE level (exposure compensation) adjustment

Zoom

1 Select the [CAMERA] menu → [SW MODE] → [REAR RING] → [ZOOM].

2 Rotate the rear ring.

Iris

1 Select the [CAMERA] menu → [SW MODE] → [REAR RING] → [IRIS] or [IRIS/AE LEVEL].

2 Switch to <MANU> with the <AUTO/MANU> switch to enter manual mode.

3 Press the <IRIS> button to switch to manual iris mode.

[STD] disappears.

4 Rotate the rear ring.

AE level (exposure compensation)

1 Select the [SCENE FILE] menu → [AE LEVEL] → [ON].

2 Select the [CAMERA] menu → [SW MODE] → [REAR RING] → [IRIS/AE LEVEL].

3 When the <AUTO/MANU> switch is set to manual mode, use one of the following operations to switch one of iris, gain, or shutter speed to auto.

- Press the <IRIS> button to switch to auto iris mode.
- Press the <GAIN> button to switch to auto gain mode.
- Press the <SHUTTER> button to switch to auto shutter mode.

4 Rotate the rear ring.

NOTE

• When manual iris mode is enabled, the iris is adjusted when the rear ring is turned.

Focusing (manual focus)

1 Switch to <MANU> with the <AUTO/MANU> switch to enter manual mode.

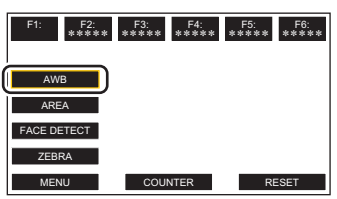
2 Press the <FOCUS A/M/∞> button to switch to manual focus mode.

[AF] and [MF] switch each time you press the button. The focal point goes to infinity after you press and hold the button, and then the manual focus mode is engaged.

3 Rotate the focus ring.

White balance adjustment

Follow the steps below to adjust the white balance automatically.



- White balance/black balance adjustment is done using the [AWB] USER button function. Make the settings beforehand.
  It is set in the [USER6] button icon at the time of purchase.
  To display the operation icon, touch and hold the screen for approximately 2 seconds while the camera recording screen is being displayed.

■ **When stored in white balance [Ach]**

1 Switch to <MANU> with the <AUTO/MANU> switch to enter manual mode.

2 Set the gain value. (➜ 49)

Normally, set this to 0 dB. If it is too dark, set the gain to an appropriate value.

3 Press the <WHITE BAL> button to switch to [Ach].

Each time you press the button, the white balance switches in the order “Preset”, [Ach], [Bch].

4 Change the <ND FILTER> switch settings according to the light conditions.

5 Place the white pattern at a point where the light conditions match those for the light source for the subject, and zoom in on the white pattern so that the white color appears in the screen.

6 Adjust the iris (the lens stop).

Adjust the iris so that the brightness of Y GET is approx. 70%.

7 Either press the USER button assigned to [AWB] or touch the USER button icon.

Automatic adjustment of the white balance starts and the white balance adjustment value is memorized.

NOTE

- The content previously set is maintained in [Ach] or [Bch]. Make the settings again if the lighting conditions have changed.

When having no time to adjust the white balance

1 Press the <WHITE BAL> button to switch to “Preset”.

2 Either press the USER button assigned to [AWB] or touch the USER button icon to switch the white balance.

[P 3200K], [P 5600K], and “VAR” (the value set in the [CAMERA] menu → [SW MODE] → [W.BAL VAR]) change in order.

- When “VAR” is selected, turning the multidial can set any white balance value between [V 2000K] and [V 15000K].

NOTE

- The “VAR” value displayed on the camera image screen is not guaranteed to be an absolute value.Use it for reference purposes only.

Gain

If the camera screen is dark, increase the gain to brighten the screen.

1 Switch to <MANU> with the <AUTO/MANU> switch to enter manual mode.

2 Press the <GAIN> button to switch to manual gain mode.

The gain display is highlighted in orange.

3 Turn the multidial to adjust, then press the multidial.

The setting changes to the value displayed and exits.

Press the <EXIT> button to exit without changing the setting.

Setting the shutter speed

1 Switch to <MANU> with the <AUTO/MANU> switch to enter manual mode.

2 Press the <SHUTTER> button to switch to manual shutter mode.

The shutter speed display is highlighted in orange.

3 Turn the multidial to select the shutter speed.

4 Press the multidial.

The setting changes to the value displayed and exits.

Press the <EXIT> button to exit without changing the setting.

Playing back clips

1 Press the <THUMBNAIL> button.

The thumbnail screen is displayed.

2 Select the clip to play back.

Playback from operation icons

Playback operation	Operating procedure
Playback/pause	Touch ▶/❚❚.
Fast-reverse playback	Touch ◀◀. Touch twice to increase the speed.
Fast-forward playback	Touch ▶▶. Touch twice to increase the speed.
Stop (return to thumbnail screen)	Touch ■.

Updating the unit's firmware

Confirm the firmware version of the unit in the [OTHERS] menu → [INFORMATION] → [VERSION], access the most current information regarding firmware in the website described in NOTE, and download the firmware as necessary.

NOTE

- Update is completed by loading the downloaded file to the unit via the memory card. Insert the memory card that stores the update file into card slot 1, and select the [OTHERS] menu → [INFORMATION] → [UPDATE].
  For the latest update information, check the support website below. (As of January 2020)
  https://panasonic.jp/support/global/cs/e_cam
  (This website is in English only.)
- When updating the firmware, use the AC adaptor or sufficiently charged battery.
- Do not turn off the power while updating the firmware. Rewriting of the firmware may fail and the unit may not be activated.

Specifications

General

Power
7.28 V ⎓ (when battery is used)
12 V ⎓ (when the AC adaptor is used)
Power consumption
22.9 W (Charging)
X1500
14.4 W (When the LCD monitor is used)
X2000
15.5 W (When the LCD monitor is used)

Item	X1500	X2000
Ambient operating temperature	0 °C to 40 °C (32 °F to 104 °F)	
Ambient operating humidity	10% to 80% (relative humidity, no condensation)	
Mass (Weight)	Approx. 0.9 kg (Approx. 1.98 lbs.) (main unit only, excluding lens hood, battery and supplied accessories)	Approx. 0.9 kg (Approx. 1.98 lbs.) (main unit only, excluding handle unit, lens hood, battery and supplied accessories)
	Approx. 1.2 kg (Approx. 2.65 lbs.) (including lens hood, battery and eye cup)	Approx. 1.5 kg (Approx. 3.31 lbs.) (including handle unit, lens hood, battery and eye cup)
External dimensions (W×H×D)	129 mm×93 mm×257 mm (5.08 ″ × 3.66 ″ × 10.1 ″) (including lens hood and eye cup, excluding protrusions)	129 mm×159 mm×257 mm (5.08 ″ × 6.26 ″ × 10.1 ″) (including handle unit, lens hood, and eye cup, excluding protrusions)

Camera

Pickup device	1/2.5 ″ MOS solid-state image sensing device for colors Total pixels: approx. 8,570,000 pixels
Number of pixels	Number of effective pixels: approx. 8,290,000 pixels
Lens	Optical image stabilizer lens, motorized 24× zoom F1.8 to F4.0 (f=4.12 mm to 98.9 mm) 35 mm conversion: f=25.0 mm to 600.0 mm
Filter diameter	62 mm (2.44 ″)
ND filter	<CLR>, <1/4>, <1/16>, <1/64>

Minimum object distance (M.O.D)	Approx. 0.1 m (3.93 ″) (wide angle) from the lens Approx. 1.2 m (47.2 ″) (telephoto angle) from the lens
IR cut filter	Has functionality to switch IR filter on/off (switched with [IR REC] USER button or menu)
Gain setting	0 dB to 30 dB ● When [S.GAIN] is assigned to a USER button, [SUPER GAIN]/[SUPER GAIN+] can be set
Color temperature setting	ATW, ATW LOCK, Ach, Bch, preset 3200 K/preset 5600 K/VAR (2000 K to 15000 K)
Shutter speed	When the [SYSTEM] menu → [FREQUENCY] → [59.94Hz] is set ● 59.94i/59.94p mode: 1/60 sec., 1/100 sec., 1/120 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec. ● 29.97p mode: 1/30 sec., 1/50 sec., 1/60 sec., 1/100 sec., 1/120 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec. ● 23.98p mode: 1/24 sec., 1/48 sec., 1/50 sec., 1/60 sec., 1/100 sec., 1/120 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec. When the [SYSTEM] menu → [FREQUENCY] → [50.00Hz] is set ● 50.00i/50.00p mode: 1/50 sec., 1/60 sec., 1/100 sec., 1/125 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec. ● 25.00p mode: 1/25 sec., 1/50 sec., 1/60 sec., 1/100 sec., 1/125 sec., 1/180 sec., 1/250 sec., 1/350 sec., 1/500 sec., 1/750 sec., 1/1000 sec., 1/1500 sec., 1/2000 sec., 1/3000 sec., 1/4000 sec., 1/8000 sec.
Slow shutter speed	When the [SYSTEM] menu → [FREQUENCY] → [59.94Hz] is set ● 59.94i/59.94p mode: 1/8 sec., 1/15 sec., 1/30 sec. ● 29.97p mode: 1/8 sec., 1/15 sec. ● 23.98p mode: 1/6 sec., 1/12 sec. When the [SYSTEM] menu → [FREQUENCY] → [50.00Hz] is set ● 50.00i/50.00p mode: 1/6 sec., 1/12 sec., 1/25 sec. ● 25.00p mode: 1/6 sec., 1/12 sec.

Super slow recording	● [SYSTEM] menu → [FREQUENCY] → [59.94Hz] When the number of recording pixels is 1920×1080 (FHD) Recording frame rate 120 fps, slow motion effect 1/2 speed (in 59.94p mode), slow motion effect 1/4 speed (in 29.97p mode), 1/5 speed (in 23.98p mode) ● [SYSTEM] menu → [FREQUENCY] → [50.00Hz] When the number of recording pixels is 1920×1080 (FHD) Recording frame rate 100 fps, slow motion effect 1/2 speed (in 50.00p mode), slow motion effect 1/4 speed (in 25.00p mode)
Minimum illuminance of subject	1.5 lx (F1.8, [SUPER GAIN+] is enabled, when shutter speed is 1/30 sec.)
Digital zoom	2×/5×/10×/i.ZOOM (maximum 48×)
Built-in LED light (When using the handle unit (X2000 supplied, X1500 optional))	Illuminance: approx. 70 lx (1.0 m (approx. 3.3 feet)) Illumination angle: approx. 30° Color temperature: approx. 4600 K
Lens hood	Hood with lens cover

Memory card recorder

Recording media	SDHC memory card (4 GB to 32 GB), SDXC memory card (exceeding 32 GB to 128 GB): UHS-I, UHS Speed Class 3 compatible ● Refer to “Speed Class during shooting” (➜ 38).
Recording slot	2 slots
System frequency	59.94 Hz/50.00 Hz
File format	MOV (HEVC), MOV, MP4 (HEVC), MP4, AVCHD
Recording format	● MOV: 4:2:0 (10bit) UHD (3840×2160); HEVC LongGOP 200M (Average approx. 200 Mbps)/ HEVC LongGOP 150M (Average approx. 150 Mbps) ● MOV: 4:2:0 (8bit) UHD (3840×2160); 420LongGOP 150M (Average approx. 150 Mbps)/ 420LongGOP 100M (Average approx. 100 Mbps) ● MOV: 4:2:2 (10bit) UHD (3840×2160); 422LongGOP 150M (Average approx. 150 Mbps) FHD (1920×1080); 422LongGOP 100M (Average approx. 100 Mbps)/ 422LongGOP 50M (Average approx. 50 Mbps)/ 422ALL-I 200M (Average approx. 200 Mbps)/ 422ALL-I 100M (Average approx. 100 Mbps)

Recording format	● MP4: 4:2:0 (10bit) UHD (3840×2160); HEVC LongGOP 100M (Average approx. 100 Mbps)/ HEVC LongGOP 72M (Average approx. 72 Mbps) ● MP4: 4:2:0 (8bit) UHD (3840×2160); 420LongGOP 72M (Average approx. 72 Mbps) FHD (1920×1080); 420LongGOP 50M (Average approx. 50 Mbps) ● AVCHD: 4:2:0 (8bit) FHD (1920×1080); PS (Average approx. 25 Mbps)/PH (Average approx. 21 Mbps)/ HA (Average approx. 17 Mbps) HD (1280×720); PM (Average approx. 8 Mbps)
Number of recording pixels/ Recording video signal	3840×2160/59.94p, 50.00p, 29.97p, 25.00p, 23.98p 1920×1080/59.94p, 50.00p, 29.97p, 25.00p, 23.98p, 59.94i, 50.00i 1280×720/59.94p, 50.00p
Recording and playback time	Refer to the owner's manual (PDF) for information about the recording and playback times.
2-slot function	Relay recording, simultaneous recording, background recording
Still image recording	Recording format: JPEG (DCF/Exif2.2) ● Refer to the owner's manual (PDF) for information about recording methods and the number of recording pixels.

Digital video

Number of quantizing bits	● MOV: 4:2:2 (10bit)/4:2:0 (8bit)/4:2:0 (10bit (HEVC)) ● MP4: 4:2:0 (8bit)/4:2:0 (10bit (HEVC)) ● AVCHD: 4:2:0 (8bit)
Video compression format	● MOV/MP4: H.264/MPEG-4 AVC High Profile, H.265/MPEG-H HEVC Main10 Profile ● AVCHD: H.264/MPEG-4 AVC High Profile

Digital audio

Recording audio signal	● MOV: 48 kHz/24bit, 2ch ● MP4/AVCHD: 48 kHz/16bit, 2ch
Audio compression format	● MOV: LPCM ● MP4: AAC ● AVCHD: Dolby Audio™
Headroom	12 dB

Streaming

Video compression format	H.264/MPEG-4 AVC Main Profile H.264/MPEG-4 AVC High Profile
Video resolution	1920×1080 (FHD), 1280×720 (HD), 640×360, 320×180
Streaming method	Unicast, Multicast
Frame rate	● When set to the [SYSTEM] menu → [FREQUENCY] → [59.94Hz]: 30 fps, 60 fps ● When set to the [SYSTEM] menu → [FREQUENCY] → [50.00Hz]: 25 fps, 50 fps
Bit rate	24 Mbps, 20 Mbps, 16 Mbps, 14 Mbps, 8 Mbps, 6 Mbps, 4 Mbps, 3 Mbps, 2 Mbps, 1.5 Mbps, 1 Mbps, 0.7 Mbps, 0.5 Mbps
Audio compression format	AAC-LC: 48 kHz/16-bit, 2ch
Supported protocol	RTSP/RTP/RTMP/RTMPS

Wi-Fi

Compliance standard	IEEE802.11b/g/n compliant
Frequency range used (central frequency)	2412 MHz to 2462 MHz [1 to 11ch]
Encryption method	Wi-Fi compliant WPA™/WPA2™
Access method	Infrastructure mode

Video output

Item	X1500	X2000
<SDI OUT> terminal	—	● BNC terminal ×1 0.8 V [p-p], 75 Ω, 3G/1.5G HD-SDI compatible ● Output format 1920×1080: 59.94p LEVEL-A, 50.00p LEVEL-A, 59.94i, 50.00i, 29.97PsF, 25.00PsF, 23.98PsF 1280×720: 59.94p, 50.00p
<HDMI> terminal	● HDMI type A terminal ×1 (not compatible with VIERA Link) ● Output format 3840×2160: 59.94p, 50.00p, 29.97p, 25.00p, 23.98p 1920×1080: 59.94p, 50.00p, 59.94i, 50.00i, 29.97p, 25.00p, 23.98p 1280×720: 59.94p, 50.00p 720×480: 59.94p 720×576: 50.00p	

Audio input

Built-in microphone	Supports stereo microphone
<MIC> terminal	3.5 mm diameter stereo mini jack × 1
<INPUT 1>/<INPUT 2> terminal (When using the handle unit (X2000 supplied, X1500 optional))	XLR×2, 3-pin Input high impedance, <LINE>/<MIC>/<+48V> (Switched with <INPUT1>/<INPUT2> switch) ● <LINE>: 4 dBu/0 dBu (switched with menu) ● <MIC>: −40 dBu/−50 dBu/−60 dBu (switched with menu)

Audio output

Item	X1500	X2000
<SDI OUT> terminal	—	LPCM 2ch ● Gain switching: 0 dB/−6 dB/−8 dB (switched with menu)
<HDMI> terminal	LPCM 2ch	
Headphone terminal	3.5 mm (0.14 ″) diameter stereo mini jack × 1	
Speaker	15 mm (approx. 0.59 ″) diameter, round ×1	

Other input/output

<REMOTE> terminal	2.5 mm (approx. 0.10 ″) diameter super mini jack × 1
USB terminal (USB2.0)	Micro-AB terminal, 5pin, with USB mass storage functionality (read only)
<DC IN 12V> terminal	DC12 V, EIAJ type 4

Monitor

LCD monitor	3.5 ″ LCD monitor (approx. 2,760,000 dots)
Viewfinder	0.24 ″ EVF (equivalent to approx. 1,560,000 dots)

Handle unit ([X2000] supplied, [X1500] optional)

Power consumption
Maximum approx. 3.1 W (when connected to the camera)

Mass (Weight)	Approx. 305 g (Approx. 0.67 lbs.) (main part of the handle unit only, excluding microphone holder and microphone holder mounting screws)
External dimensions (W×H×D)	Approx. 71 mm× 89 mm× 207 mm (Approx. 2.80 ″ × 3.50 ″ × 8.15 ″) (including protrusions, excluding microphone holder)

AC adaptor

Power source
100 V – 240 V ~ 50 Hz/60 Hz, 1.2 A 79 VA (100 V ~) – 99 VA (240 V ~)
Power output
12 V ⎓ 3.0 A

Ambient operating temperature	0 °C to 40 °C (32 °F to 104 °F)
Ambient operating humidity	10% to 90% (relative humidity, no condensation)
Mass (Weight)	Approx. 225 g (Approx. 0.496 lbs.)
External dimensions (W×H×D)	115 mm×37 mm×57 mm (4-1/2 ″ × 1-7/16 ″ × 2-1/4 ″) (excluding the DC cable section)

Battery pack (AG-VBR59)

Voltage/capacity
7.28 V ⎓ 5900 mAh 43 Wh

Charging current	Maximum 4000 mA
Ambient operating humidity	0% to 80% (relative humidity, no condensation)
Mass (Weight)	Approx. 230 g (Approx. 0.507 lbs.)
External dimensions (W×H×D)	41.3 mm×51.3 mm×69.6 mm (1-5/8 ″ × 2 ″ × 2-3/4 ″)

Limited Warranty (ONLY FOR U.S.A.)

Panasonic Products Limited Warranty

Limited Warranty Coverage (For USA Only)
If your product does not work properly because of a defect in materials or workmanship, Panasonic Corporation of North America (referred to as "the warrantor") will, for the length of the period indicated on the chart below, which starts with the date of original purchase ("warranty period"), at its option either (a) repair your product with new or refurbished parts, (b) replace it with a new or a refurbished equivalent value product, or (c) refund your purchase price. The decision to repair, replace or refund will be made by the warrantor.

Product or Part Name	Parts	Labor
4K Video Camera	1 Year	90 Days
All included Accessories (Except Non-Rechargeable Batteries)	90 Days	Not Applicable
Only Non-Rechargeable Batteries	10 Days	Not Applicable

During the "Labor" warranty period there will be no charge for labor. During the "Parts" warranty period, there will be no charge for parts. This Limited Warranty excludes both parts and labor for non-rechargeable batteries, antennas, and cosmetic parts (cabinet). This warranty only applies to products purchased and serviced in the United States. This warranty is extended only to the original purchaser of a new product which was not sold "as is".

Mail-In Service--Online Repair Request

Online Repair Request
To submit a new repair request and for quick repair status visit our Web Site at http://shop.panasonic.com/support.

When shipping the unit, carefully pack, include all supplied accessories listed in the Owner's Manual, and send it prepaid, adequately insured and packed well in a carton box. When shipping Lithium Ion batteries please visit our Web Site at http://shop.panasonic.com/support as Panasonic is committed to providing the most up to date information. Include a letter detailing the complaint, a return address and provide a daytime phone number where you can be reached. A valid registered receipt is required under the Limited Warranty.

IF REPAIR IS NEEDED DURING THE WARRANTY PERIOD, THE PURCHASER WILL BE REQUIRED TO FURNISH A SALES RECEIPT/PROOF OF PURCHASE INDICATING DATE OF PURCHASE, AMOUNT PAID AND PLACE OF PURCHASE. CUSTOMER WILL BE CHARGED FOR THE REPAIR OF ANY UNIT RECEIVED WITHOUT SUCH PROOF OF PURCHASE.

Limited Warranty Limits And Exclusions
This warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. The warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by products not supplied by the warrantor, or failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, set-up adjustments, misadjustment of consumer controls, improper maintenance, power line surge, lightning damage, modification, introduction of sand, humidity or liquids, commercial use such as hotel, office, restaurant, or other business or rental use of the product, or service by anyone other than a Factory Service Center or other Authorized Servicer, or damage that is attributable to acts of God.

THERE ARE NO EXPRESS WARRANTIES EXCEPT AS LISTED UNDER "LIMITED WARRANTY COVERAGE".
THE WARRANTOR IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT, OR ARISING OUT OF ANY BREACH OF THIS WARRANTY.
(As examples, this excludes damages for lost time, travel to and from the servicer, loss of or damage to media or images, data or other memory or recorded content. The items listed are not exclusive, but for illustration only.)
ALL EXPRESS AND IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY, ARE LIMITED TO THE PERIOD OF THE LIMITED WARRANTY.
Some states do not allow the exclusion or limitation of incidental or consequential damages, or limitations on how long an implied warranty lasts, so the exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. If a problem with this product develops during or after the warranty period, you may contact your dealer or Service Center. If the problem is not handled to your satisfaction, then write to:

Panasonic Corporation of North America
Consumer Affairs Department 8th Fl.
Two Riverfront Plaza
Newark NJ 07102-5490

PARTS AND SERVICE, WHICH ARE NOT COVERED BY THIS LIMITED WARRANTY, ARE YOUR RESPONSIBILITY.

Shop Accessories!

for all your Panasonic gear

Go to

http://shop.panasonic.com/support

Get everything you need to get the most out of your Panasonic products
Accessories & Parts for your Camera, Phone, A/V products, TV, Computers & Networking, Personal Care, Home Appliances, Headphones, Batteries, Backup Chargers & more…

Customer Services Directory

For Product Information, Operating Assistance, Parts, Owner's Manuals, Dealer and Service info
go to http://shop.panasonic.com/support

For the hearing or speech impaired TTY: 1- 877-833-8855

As of December 2019

Warranty (For Canadian Customers)

Panasonic Canada Inc.
5770 Ambler Drive, Mississauga, Ontario L4W 2T3

PANASONIC PRODUCT – LIMITED WARRANTY

Panasonic Canada Inc. warrants this product to be free from defects in material and workmanship under normal use and for a period as stated below from the date of original purchase agrees to, at its option either (a) repair your product with new or refurbished parts, (b) replace it with a new or a refurbished equivalent value product, or (c) refund your purchase price. The decision to repair, replace or refund will be made by Panasonic Canada Inc.

Camcorder Products - One (1) year, parts and labour

This warranty is given only to the original purchaser, or the person for whom it was purchased as a gift, of a Panasonic brand product mentioned above sold by an authorized Panasonic dealer in Canada and purchased and used in Canada, which product was not sold "as is", and which product was delivered to you in new condition in the original packaging.

IN ORDER TO BE ELIGIBLE TO RECEIVE WARRANTY SERVICE HEREUNDER, A PURCHASE RECEIPT OR OTHER PROOF OF DATE OF ORIGINAL PURCHASE, SHOWING AMOUNT PAID AND PLACE OF PURCHASE IS REQUIRED

LIMITATIONS AND EXCLUSIONS

This warranty ONLY COVERS failures due to defects in materials or workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. The warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by products not supplied by Panasonic Canada Inc., or failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, faulty installation, set-up adjustments, misadjustment of consumer controls, improper maintenance, improper batteries, power line surge, lightning damage, modification, introduction of sand, humidity or liquids, commercial use such as hotel, office, restaurant, or other business or rental use of the product, or service by anyone other than an Authorized Servicer, or damage that is attributable to acts of God.

Dry cell batteries are also excluded from coverage under this warranty. Rechargeable batteries are warranted for ninety (90) days from date of original purchase.

THIS EXPRESS, LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL PANASONIC CANADA INC. BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT OR ARISING OUT OF ANY BREACH OF ANY EXPRESS OR IMPLIED WARRANTY. (As examples, this warranty excludes damages for lost time, travel to and from the Authorized Servicer, loss of or damage to media or images, data or other memory or recorded content. This list of items is not exhaustive, but for illustration only.)

In certain instances, some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, or the exclusion of implied warranties, so the above limitations and exclusions may not be applicable. This warranty gives you specific legal rights and you may have other rights which vary depending on your province or territory.

WARRANTY SERVICE

For product operation, repairs and information assistance, please visit our Support page:

www.panasonic.ca/english/support

IF YOU SHIP THE PRODUCT TO A SERVICENTRE
Carefully pack and send prepaid, adequately insured and preferably in the original carton.
Include details of the defect claimed, and proof of date of original purchase.

Useful Information (Only For Latin American Countries)

Customer Service

Customer Service Directory

Obtain products information and operative assistant; localize the closer distributor or Service Center; buy spare parts and accessories by our Web Site to Latin American:

COUNTRY	WEB SITE	CONTACT CENTER
Panama	www.panasonic.com/pa/soporte/	800-7262
Colombia	www.panasonic.com/co/soporte/	01-8000-947262
Ecuador	www.panasonic.com/ec/soporte/	1-800-726276
Costa Rica	www.panasonic.com/cr/soporte/	800-7262737
El Salvador	www.panasonic.com/sv/soporte/	800-7262
Guatemala	www.panasonic.com/gt/soporte/	1-801-811-7262
Uruguay	www.panasonic.com/uy/soporte/	0-800-7262
Paraguay	www.panasonic.com/uy/soporte/	0-800-11-7262
Chile	www.panasonic.com/cl/soporte/	800-390-602 022-797-5000
Peru	www.panasonic.com/pe/soporte/	0800-00726
Venezuela	www.panasonic.com/ve/soporte/	800-7262-800
Mexico	www.panasonic.com/mx/soporte/	01800-847-7262 55-5000-1200
Argentina	www.panasonic.com/ar/soporte/	0800-333-7262 0810-321-7262
Dominican Republic	www.panasonic.com/do/soporte/	809-200-8000

Panasonic Corporation
Web site: http://www.panasonic.com

Panasonic Corporation of North America
Two Riverfront Plaza, Newark, NJ 07102-5490
http://shop.panasonic.com

Panasonic Canada Inc.
5770 Ambler Drive, Mississauga, Ontario, L4W 2T3
www.panasonic.com

© Panasonic Corporation 2020
Printed in Malaysia